

MEMORANDUM

TO: Terry Taylor  
Anderson, Mulholland and Associates

DATE: December 20, 2011

FROM: R. Infante 

FILE: JA94117

RE: Data Validation  
**BMSMC: Building 5 Area, PR**  
**SM04.00.06**  
Accutest Job Number: JA94117

**SUMMARY**

Full validation was performed on the data for six (6) soil samples and one (1) trip blank analyzed for selected volatile organic compounds using EPA method SW-846 8260B and six (6) soil samples and one (1) trip blank analyzed for alcohols (methanol and isopropyl alcohol) by EPA method SW-846 8015 (DAI). The samples were collected at the BMSMC Building 5 Area in Humacao, PR on December 6 and 7, 2011 and submitted to Accutest Laboratories that analyzed and reported the results under delivery group (SDG) JA94117.

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: *"USEPA Region 2, SOP HW-24, Standard Operating Procedure for the Validation of Organic Data Acquired using SW-846 Method 8260B (August 2009–Revision 2), the USEPA National Functional Guidelines for Low Concentration Organic Data Review (August 2009–Revision 2), the USEPA National Functional Guidelines for Organic Data Review for Low Concentration (SOP HW-13, August 2009–Revision 3)* (noted herein as the "primary guidance document"). Also, QC criteria from *"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update III, December 1996),"* are utilized. The guidelines were modified to accommodate the non-CLP methodology. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

In general the data is valid as reported and may be used for decision making purposes. The data results are acceptable for use. Some of the results were qualified.

## SAMPLES

The samples included in the review are listed below

FIELD SAMPLE ID	LABORATORY ID	ANALYSIS
I-3 (5 - 6)	JA94117-1	VOCs, ALCOHOLS
I-2 (10 - 10.5)	JA94117-2	VOCs, ALCOHOLS
I-7 (10 - 11)	JA94117-3	VOCs, ALCOHOLS
I-8 (14 - 15)	JA94117-4	VOCs, ALCOHOLS
I-8 (14 - 15)DUP	JA94117-5	VOCs, ALCOHOLS
I-9 (8.5 - 9.5)	JA94117-6	VOCs, ALCOHOLS
TB120711	JA94117-7	VOCs, ALCOHOLS

## REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Surrogate spike recovery
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Internal standard performance
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

## DISCUSSION

### Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

### Holding Times and Sample Preservation

The cooler temperatures were within the QC acceptance criteria of  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ .

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

### GC/MS Tunes

The frequency and abundance of bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within the tuning criteria associated with the method.

### Initial and Continuing Calibrations

#### VOCs

The percent relative standard deviations (%RSDs) and response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration. Correlation coefficients ( $r^2$ ) of target analytes were within the QC acceptance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard. All initial and continuing calibrations met the acceptance criteria except for the following analytes:

DATE	LAB FILE ID#	CRITERIA OUT: %D	COMPOUND	AFFECTED SAMPLES
12/012/11	cc435-20	23.6	MIBK	JA94117-7

Qualify results (J) in affected samples.

#### Alcohols

The percent relative standard deviations (%RSDs) and response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration. Correlation coefficients ( $r^2$ ) of target analytes were within the QC acceptance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard. All initial and continuing calibrations met the acceptance criteria

### Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks for VOCs and alcohols.

No target analytes (VOCs and alcohols) in the trip blank associated with this data set.

No field/equipment blanks associated with this data set.

### Surrogate Spike Recovery

The surrogate recoveries were within the laboratory QC acceptance limits in all samples analyzed for VOCs and alcohols except for the following:

#### VOCs

- DBFM outside control limits in sample JA94077-1MS/1-MSD: 23/28 % recovery; control limit 67 – 137 %. No action taken; QC sample.

#### Alcohols

- Hexanol outside control limit in sample JA94117-3: 367/262 % recovery; control limit 58 – 137 %. No action taken; recoveries within control limits in Run #1.

### MS/MSD

#### VOCs

Matrix spike was performed on samples JA94117-7MS/-7MSD (Aqueous); JA94124-3MS/-3MSD (Soil); JA94077-1MS/-1MSD (Soil); JA94117-1MS/-1MSD (Soil); JA93637-1MS/-1MSD (Soil); and JA943776-3MS/-3MSD. Recoveries and RPD for the MS/MSD were within laboratory control except for the following:

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
=====					
JA94124-3MS/-3MSD					
__MS__	Ethylbenzene	172	20	144	Qualify_results_(j)
__MS__	Toluene	146	29	138	Qualify_results_(j)

Affected sample: JA94117-6

### Alcohols

Matrix spike was performed on samples JA93968-1MS/-1MSD (Soil). Recoveries and RPD for the MS/MSD were within laboratory control limits.

### Internal Standard Performance

#### VOCs

Samples were spiked with the method specified internal standard. Internal standard performance met the QC acceptance criteria in all sample analyses.

### Laboratory/Field Duplicate Results

Field duplicate associated with data package were samples JA94117-4/JA94117-5 (VOCs and alcohols). RPD results were within laboratory and generally acceptable control limits except for the following:

- Xylenes (Total) outside 50 % RPD control limit; no action taken because one of the two xylene concentration less than 5 X sample quantitation limit.

Laboratory duplicate associated with this data package were samples JA94124-4/-4 DUP. RPD results were within laboratory and generally acceptable control limits except for the following:

- Benzene 84 % RPD; control limit 50 %; no action taken because one of the two benzene concentration less than 5 X sample quantitation limit.
- Ethylbenzene 200 % RPD; control limit 50 %; no action taken because one of the two benzene concentration less than 5 X sample quantitation limit.

### LCS/LCSD Results

#### VOCs

The laboratory analyzed one LCS (blank spike) associated with each matrix from this data set. The % recoveries of all spiked analytes were within the laboratory QC acceptance limits.

#### Alcohols

The laboratory analyzed one LCS (blank spike) associated with each matrix from this data set. The % recoveries of all spiked analytes were within the laboratory QC acceptance limits.

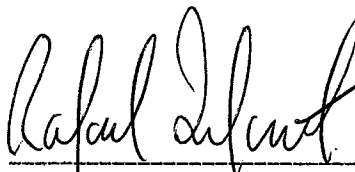
### Quantitation Limits and Sample Results

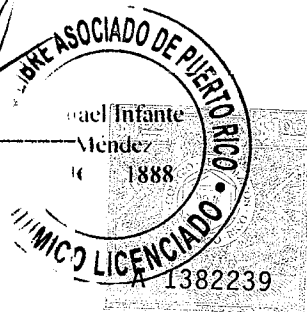
Dilutions were not required with this data set except for the following samples (alcohols):

Calculations were spot checked.

### Certification

The following samples JA94117-1; JA94117-2; JA94117-3; JA94117-4; JA94117-5; JA94117-6; and JA94117-7 were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. The results are valid.

  
Rafael Infante  
Chemist License 1888



## Report of Analysis

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**Client Sample ID:** I-3 (5-6)  
**Lab Sample ID:** JA94117-1  
**Matrix:** SO - Soil  
**Method:** SW846 8260B SW846 5035  
**Project:** BMSMC, Building 5 Area, PR

**Date Sampled:** 12/06/11  
**Date Received:** 12/08/11  
**Percent Solids:** 81.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	D190254.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7745
Run #2	D190283.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7746

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.5 g	5.0 ml	100 ul
Run #2	5.5 g	5.0 ml	2.5 ul

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	11500	670	450	ug/kg	
71-43-2	Benzene	19.2	67	9.0	ug/kg	J
100-41-4	Ethylbenzene	191000 <sup>a</sup>	2700	400	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	5260	340	180	ug/kg	
108-88-3	Toluene	444000 <sup>a</sup>	2700	1000	ug/kg	
1330-20-7	Xylene (total)	736000 <sup>a</sup>	2700	500	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%	103%	67-131%
17060-07-0	1,2-Dichloroethane-D4	103%	100%	66-130%
2037-26-5	Toluene-D8	108%	108%	76-125%
460-00-4	4-Bromofluorobenzene	101%	98%	53-142%

(a) Result is from Run# 2



ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

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**Client Sample ID:** I-3 (5-6)  
**Lab Sample ID:** JA94117-1  
**Matrix:** SO - Soil  
**Method:** SW846-8015 (DAI)  
**Project:** BMSMC, Building 5 Area, PR

**Date Sampled:** 12/06/11  
**Date Received:** 12/08/11  
**Percent Solids:** 81.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH85765.D	1	12/09/11	XPL	n/a	n/a	GGH3918
Run #2							

	Initial Weight
Run #1	5.0 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	57000	120	47	ug/kg	
67-56-1	Methanol	0.00	250	63	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	100%		58-137%
111-27-3	Hexanol	62%		58-137%



ND = Not detected      MDL - Method Detection Limit  
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 N = Indicates presumptive evidence of a compound



## Report of Analysis

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<b>Client Sample ID:</b>	I-2 (10-10.5)	<b>Date Sampled:</b>	12/06/11
<b>Lab Sample ID:</b>	JA94117-2	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	79.4
<b>Method:</b>	SW846 8260B SW846 5035		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	D190284.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7746
Run #2	D190255.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7745

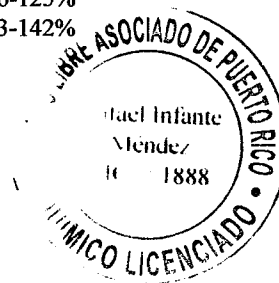
Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.8 g	5.0 ml	10.0 ul
Run #2	4.8 g	5.0 ml	100 ul

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	2850 <sup>a</sup>	790	520	ug/kg	
71-43-2	Benzene	ND <sup>a</sup>	79	10	ug/kg	
100-41-4	Ethylbenzene	57500	790	120	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	106000	3900	2100	ug/kg	
108-88-3	Toluene	54900	790	300	ug/kg	
1330-20-7	Xylene (total)	229000	790	140	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%	100%	67-131%
17060-07-0	1,2-Dichloroethane-D4	100%	101%	66-130%
2037-26-5	Toluene-D8	110%	112%	76-125%
460-00-4	4-Bromofluorobenzene	97%	100%	53-142%

(a) Result is from Run# 2



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J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

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## Report of Analysis

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Client Sample ID: I-2 (10-10.5)

Lab Sample ID: JA94117-2

Matrix: SO - Soil

Method: SW846-8015 (DAI)

Project: BSMC, Building 5 Area, PR

Date Sampled: 12/06/11

Date Received: 12/08/11

Percent Solids: 79.4

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH85773.D	1	12/09/11	XPL	n/a	n/a	GGH3918
Run #2							

## Initial Weight

Run #1 5.1 g

Run #2

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	2850	120	47	ug/kg	
67-56-1	Methanol	3320	250	63	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	105%		58-137%
111-27-3	Hexanol	94%		58-137%



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 N = Indicates presumptive evidence of a compound

## Report of Analysis

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<b>Client Sample ID:</b>	I-7 (10-11)	<b>Date Sampled:</b>	12/06/11
<b>Lab Sample ID:</b>	JA94117-3	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	85.9
<b>Method:</b>	SW846 8260B SW846 5035		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	D190281.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7746
Run #2	D190256.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7745
Run #3	D190282.D	5	12/13/11	ET	12/09/11 09:00	n/a	VD7746

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.2 g	5.0 ml	2.0 ul
Run #2	5.2 g	5.0 ml	100 ul
Run #3	5.2 g	5.0 ml	1.0 ul

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	127000	32000	21000	ug/kg	
71-43-2	Benzene	33.5 <sup>a</sup>	64	8.5	ug/kg	J
100-41-4	Ethylbenzene	1320000 <sup>b</sup>	32000	4700	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	1080000 <sup>b</sup>	160000	84000	ug/kg	
108-88-3	Toluene	64100	3200	1200	ug/kg	
1330-20-7	Xylene (total)	4900000 <sup>b</sup>	32000	5900	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
1868-53-7	Dibromofluoromethane	102%	98%	103%	67-131%
17060-07-0	1,2-Dichloroethane-D4	100%	99%	101%	66-130%
2037-26-5	Toluene-D8	110%	113%	112%	76-125%
460-00-4	4-Bromofluorobenzene	97%	104%	101%	53-142%

(a) Result is from Run# 2

(b) Result is from Run# 3



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 N = Indicates presumptive evidence of a compound

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## Report of Analysis

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Client Sample ID: I-7 (10-11)

Lab Sample ID: JA94117-3

Matrix: SO - Soil

Method: SW846-8015 (DAI)

Project: BMSMC, Building 5 Area, PR

Date Sampled: 12/06/11

Date Received: 12/08/11

Percent Solids: 85.9

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH85774.D	1	12/09/11	XPL	n/a	n/a	GGH3918
Run #2	GH85767.D	1	12/09/11	XPL	n/a	n/a	GGH3918

	Initial Weight
Run #1	0.50 g
Run #2	5.0 g

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	500000	1200	440	ug/kg	
67-56-1	Methanol	1050000	2300	600	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	133%	367% <sup>a</sup>	58-137%
111-27-3	Hexanol	133%	262% <sup>a</sup>	58-137%

(a) Outside control limits due to matrix interference.



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## Report of Analysis

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<b>Client Sample ID:</b>	I-8 (14-15)	<b>Date Sampled:</b>	12/07/11
<b>Lab Sample ID:</b>	JA94117-4	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	84.7
<b>Method:</b>	SW846 8260B SW846 5035		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

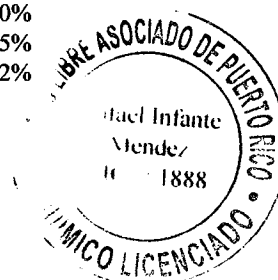
	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y118403.D	1	12/12/11	RS	12/09/11 09:00	n/a	VY5058
Run #2							

	Initial Weight
Run #1	4.9 g
Run #2	

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	15.0	12	8.0	ug/kg	
71-43-2	Benzene	1.5	1.2	0.16	ug/kg	
100-41-4	Ethylbenzene	ND	1.2	0.18	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	6.0	3.2	ug/kg	
108-88-3	Toluene	ND	1.2	0.46	ug/kg	
1330-20-7	Xylene (total)	2.9	1.2	0.22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	91%		67-131%
17060-07-0	1,2-Dichloroethane-D4	90%		66-130%
2037-26-5	Toluene-D8	97%		76-125%
460-00-4	4-Bromofluorobenzene	95%		53-142%



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<b>Client Sample ID:</b>	I-8 (14-15)	<b>Date Sampled:</b>	12/07/11
<b>Lab Sample ID:</b>	JA94117-4	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	84.7
<b>Method:</b>	SW846-8015 (DAI)		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH85768.D	1	12/09/11	XPL	n/a	n/a	GGH3918
Run #2							

	Initial Weight
Run #1	5.1 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	ND	120	44	ug/kg	
67-56-1	Methanol	ND	230	59	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	80%		58-137%
111-27-3	Hexanol	133%		58-137%



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**Client Sample ID:** I-8 (14-15) DUP  
**Lab Sample ID:** JA94117-5  
**Matrix:** SO - Soil  
**Method:** SW846 8260B SW846 5035  
**Project:** BMSMC, Building 5 Area, PR

**Date Sampled:** 12/07/11  
**Date Received:** 12/08/11  
**Percent Solids:** 85.8

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y118404.D	1	12/12/11	RS	12/09/11 09:00	n/a	VY5058
Run #2							

Run #	Initial Weight
Run #1	4.6 g
Run #2	

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	9.7	13	8.4	ug/kg	J
71-43-2	Benzene	1.3	1.3	0.17	ug/kg	
100-41-4	Ethylbenzene	ND	1.3	0.19	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	6.3	3.3	ug/kg	
108-88-3	Toluene	ND	1.3	0.48	ug/kg	
1330-20-7	Xylene (total)	0.88	1.3	0.23	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	91%		67-131%
17060-07-0	1,2-Dichloroethane-D4	91%		66-130%
2037-26-5	Toluene-D8	97%		76-125%
460-00-4	4-Bromofluorobenzene	94%		53-142%



ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
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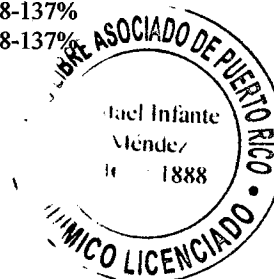
<b>Client Sample ID:</b>	I-8 (14-15) DUP	<b>Date Sampled:</b>	12/07/11
<b>Lab Sample ID:</b>	JA94117-5	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	85.8
<b>Method:</b>	SW846-8015 (DAI)		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH85769.D	1	12/09/11	XPL	n/a	n/a	GGH3918
Run #2							

	Initial Weight
Run #1	5.0 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	ND	120	44	ug/kg	
67-56-1	Methanol	ND	230	60	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	85%		58-137%
111-27-3	Hexanol	104%		58-137%



ND = Not detected      MDL - Method Detection Limit  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b>	I-9 (8.5-9.5)	<b>Date Sampled:</b>	12/07/11
<b>Lab Sample ID:</b>	JA94117-6	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	76.5
<b>Method:</b>	SW846 8260B SW846 5035		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Y118384.D	1	12/10/11	RS	12/09/11 09:00	n/a	VY5057
Run #2	D190280.D	1	12/13/11	ET	12/09/11 09:00	n/a	VD7746

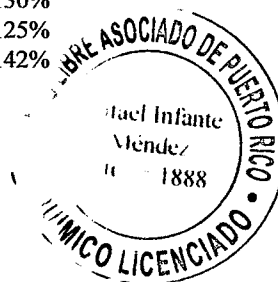
Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.5 g		
Run #2	5.6 g	5.0 ml	100 ul

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	12	7.9	ug/kg	
71-43-2	Benzene	0.48	1.2	0.16	ug/kg	J
100-41-4	Ethylbenzene	52.3 J	1.2	0.18	ug/kg	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND	5.9	3.1	ug/kg	
108-88-3	Toluene	ND J	1.2	0.45	ug/kg	
1330-20-7	Xylene (total)	2660 <sup>a</sup>	74	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	92%	101%	67-131%
17060-07-0	1,2-Dichloroethane-D4	94%	100%	66-130%
2037-26-5	Toluene-D8	96%	112%	76-125%
460-00-4	4-Bromofluorobenzene	92%	100%	53-142%

(a) Result is from Run# 2



ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

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## Report of Analysis

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<b>Client Sample ID:</b>	I-9 (8.5-9.5)	
<b>Lab Sample ID:</b>	JA94117-6	<b>Date Sampled:</b> 12/07/11
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b> 12/08/11
<b>Method:</b>	SW846-8015 (DAI)	<b>Percent Solids:</b> 76.5
<b>Project:</b>	BMSMC, Building 5 Area, PR	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH85772.D	1	12/09/11	XPL	n/a	n/a	GGH3918
Run #2							

	Initial Weight
Run #1	5.0 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	ND	130	50	ug/kg	
67-56-1	Methanol	ND	260	67	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	85%		58-137%
111-27-3	Hexanol	98%		58-137%



ND = Not detected      MDL - Method Detection Limit  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b>	TB 120711	<b>Date Sampled:</b>	12/07/11
<b>Lab Sample ID:</b>	JA94117-7	<b>Date Received:</b>	12/08/11
<b>Matrix:</b>	AQ - Trip Blank Soil	<b>Percent Solids:</b>	n/a
<b>Method:</b>	SW846 8260B		
<b>Project:</b>	BMSMC, Building 5 Area, PR		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B13607.D	1	12/12/11	RS	n/a	n/a	V4B588
Run #2							

Run #	Purge Volume
Run #1	5.0 ml
Run #2	

## VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	10	7.6	ug/l	
71-43-2	Benzene	ND	1.0	0.22	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.21	ug/l	
108-10-1	4-Methyl-2-pentanone(MIBK)	ND J	5.0	1.2	ug/l	
108-88-3	Toluene	ND	1.0	0.15	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.17	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	97%		77-120%
17060-07-0	1,2-Dichloroethane-D4	92%		70-127%
2037-26-5	Toluene-D8	92%		79-120%
460-00-4	4-Bromofluorobenzene	85%		76-118%



ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

Accutest LabLink@649183 09:01 19-Dec-2011

## Report of Analysis

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<b>Client Sample ID:</b> TB 120711		<b>Date Sampled:</b> 12/07/11	
<b>Lab Sample ID:</b> JA94117-7		<b>Date Received:</b> 12/08/11	
<b>Matrix:</b> AQ - Trip Blank Soil		<b>Percent Solids:</b> n/a	
<b>Method:</b> SW846-8015 (DAI)			
<b>Project:</b> BMSMC, Building 5 Area, PR			

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #2	GH85777.D	1	12/09/11	XPL	n/a	n/a	GGH3919

CAS No.	Compound	Result	RL	MDL	Units	Q
67-63-0	Isopropyl Alcohol	ND	100	30	ug/l	
67-56-1	Methanol	ND	200	46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	97%		48-150%
111-27-3	Hexanol	95%		48-150%



ND = Not detected      MDL - Method Detection Limit  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



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PN 1

873744211936 873744211936	Bottle Order Control # Accutest Job # JA94117
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[illegible]

JA94117: Chain of Custody  
Page 1 of 3

# DATA REVIEW WORKSHEETS

Project Number: JA94117  
Date: 12/06-07/2011

## REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Region 2, SOP HW-24, Validating Volatile Organic Compounds by GC/MS, SW-846 Method 8260B (August, 2009-Revision 2), the USEPA National Functional Guidelines for Low/Medium Concentration Organic Data Review (SOW SOM01.2 SOP HW-33, August 2009 – Revision 2), the USEPA National Functional Guidelines for Organic Data Review for Low Concentration (SOP HW-13, August, 2009-Revision 3). Also, QC criteria from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update IV, December 1998)," specifically for Methods 8000/8015 are utilized. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted. The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: JA94117 Sample matrix: Soil  
No. of Samples: 7

Trip blank No.: JA94117-7  
Field blank No.: -  
Equipment blank No.: -  
Field duplicate No.: JA94117-4/-5

<input checked="" type="checkbox"/> Data Completeness	<input checked="" type="checkbox"/> Laboratory Control Spikes
<input checked="" type="checkbox"/> Holding Times	<input checked="" type="checkbox"/> Field Duplicates
<input type="checkbox"/> N/A GC/MS Tuning	<input checked="" type="checkbox"/> Calibrations
<input type="checkbox"/> N/A Internal Standard Performance	<input checked="" type="checkbox"/> Compound Identifications
<input checked="" type="checkbox"/> Blanks	<input checked="" type="checkbox"/> Compound Quantitation
<input checked="" type="checkbox"/> Surrogate Recoveries	<input checked="" type="checkbox"/> Quantitation Limits
<input checked="" type="checkbox"/> Matrix Spike/Matrix Spike Duplicate	

Overall Comments: IPA and Methanol by SW846-8015 (DAI)

### Definition of Qualifiers:

J- Estimated results  
U- Compound not detected  
R- Rejected data  
UJ- Estimated nondetect

Reviewer: Rafael Defaut  
Date: 12/20/2011

## DATA COMPLETENESS

DATE RECEIVED

[illegible]

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met \_\_\_\_\_  
and/or see below \_\_\_\_\_

### HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

### Criteria

Aqueous samples – 14 days from sample collection for preserved samples ( $\text{pH} \leq 2$ ,  $4^{\circ}\text{C}$ ), no air bubbles.

Aqueous samples – 7 days from sample collection for unpreserved samples,  $4^{\circ}\text{C}$ , no air bubbles.

Soil samples- 7 days from sample collection.

Cooler temperature (Criteria:  $4 \pm 2^{\circ}\text{C}$ ):  $3^{\circ}\text{C}$  - OK

### Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).

If the % solids of soil samples is 10-50%, estimate positive results (J) and nondetects (UJ).

If the % solid of soil samples is  $< 10\%$ , estimate positive results (J) and reject nondetects (R).

If holding times are exceeded but  $< 14$  days beyond criteria, estimate positive results (J) and nondetects (UJ).

If holding times are exceeded but  $< 28$  days beyond criteria, estimate positive results (J) and reject nondetects (R).

If holding times are grossly exceeded ( $> 28$  days beyond criteria), reject all results (R).

If samples were not iced or if the ice were melted ( $> 10^{\circ}\text{C}$ ), estimate positive results (J) and nondetects (UJ).



## DATA REVIEW WORKSHEETS

All criteria were met \_\_N/A\_\_  
Criteria were not met see below \_\_\_\_\_

### GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

\_\_N/A\_ The BFB performance results were reviewed and found to be within the specified criteria.

\_\_N/A\_ BFB tuning was performed for every 12 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List \_\_\_\_\_ the \_\_\_\_\_ samples \_\_\_\_\_ affected:

---

If mass calibration is in error, all associated data are rejected.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below           

### CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 11/12/11

Dates of continuing calibration: 12/09/11

Instrument ID numbers: GCGH

Matrix/Level: Aqueous/low

DATE	LAB ID#	FILE	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration meet method performance criteria					

#### Criteria

All RFs must be  $> 0.05$  regardless of method requirements for SPCC.

All %RSD must be  $\leq 15\%$  regardless of method requirements for CCC.

All %Ds must be  $\leq 20\%$  regardless of method requirements for CCC.

It should be noted that Region 2 SOP HW-24 does not specify criterion for the curve correlation coefficient ( $r$ ). A limit for  $r$  of  $\geq 0.995$  has therefore been utilized as professional judgment.

#### Actions

If any compound has an initial RF or a continuing RF of  $< 0.05$ , estimate positive results (J) and reject nondetects (R), regardless of method requirements.

If any compound has a %RSD  $> 15\%$ , estimate positive results (J) and use professional judgment to qualify nondetects.

If any compound has a %RSD  $> 90\%$ , estimate positive results (J) and reject nondetects (R).

If any compound has a % D  $> 20\%$ , estimate positive results (J) and reject nondetects (R).

If any compound has a % D  $> 20\%$ , estimate positive results (J) and nondetects (UJ).

If any compound has a % D  $> 90\%$ , estimate positive results (J) and reject nondetects (R).

If any compound has  $r > 0.995$ , estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below \_\_\_\_\_

### V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

#### Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

#### Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

• • • • •

All criteria were met X  
Criteria were not met  
and/or see below \_\_\_\_\_

### V B. BLANK ANALYSIS RESULTS (Section 3)

## Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)

ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and  $\leq$  AL, report the compound as not detected (U) at the SQL.

If the concentration is  $\geq$  SQL but  $\leq$  AL, report the compound as not detected (U) at the reported concentration.

If the concentration is > SQL and > AL, report the concentration unqualified.

**Notes:**

### High and low level blanks must be treated separately

Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

[illegible]

# DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below   X  

## SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND				ACTION
	1,2-DCA	DBFM	TOL-d8	BFB	
JA94117-3	367/262 %				No action
Surrogate - Hexanol					
Recoveries OK in run #1					

QC Limits\* (Aqueous)

LL to UL to to to to

QC Limits\* (Solid-Low)

LL to UL 58 to 137 to to to

QC Limits\* (Solid-Med)

LL to UL to to to to

1,2-DCA = 1,2-Dichloromethane-d4

TOL-d8 = Toluene-d8

DBFM = Dibromofluoromethane

BFB = Bromofluorobenzene

\* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.

\* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below           

### VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

#### 1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed. List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: JA93968-1 Matrix/Level: SOIL

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
-----------	----------	-----	-----	-----------	--------

MS/MSD recoveries and RPD within laboratory control limits

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

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All criteria were met X  
Criteria were not met  
and/or see below \_\_\_\_\_

#### VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### MS/MSD – Unspiked Compounds

It should be noted that Region 2 SOP HW-24 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID: \_\_\_\_\_ Matrix/Level/Unit: \_\_\_\_\_

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION
----------	-----------------	----------	-----------	-------	--------

[illegible]

**Actions:**

- \* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).  
\* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below           

### VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

#### 1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD?  
 Yes or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT
<u>Recoveries within laboratory control limits</u>			

\* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.

\* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).

If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

#### 2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.



## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below           

### IX. FIELD DUPLICATE PRECISION

Sample IDs:   JA94117-4/-5  

Matrix:   SOIL  

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD  $\pm$  30% for aqueous samples, RPD  $\pm$  50 % for solid samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within laboratory and generally acceptable control limits					

#### Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met N/A  
Criteria were not met  
and/or see below \_\_\_\_\_

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

\* Area of +100% or -50% of the IS area in the associated calibration standard.  
\* Retention time (RT) within 30 seconds of the IS area in the associated calibration standard.

[illegible]

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -25%	IS AREA = -25 % TO - 50%	IS AREA > + 100%
Positive results	J	J	J
Nondetected results	R	UJ	ACCEPT

2. If a IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below       

### XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

JA94117-3

Methanol

RF = 13.07

$$[ ] = (8776373)/(13.07)$$

$$= 671,490 \text{ ppb OK}$$

• • • • •

All criteria were met X  
Criteria were not met  
and/or see below \_\_\_\_\_

## XII. QUANTITATION LIMITS

A. Dilution performed

[illegible]

### B. Percent Solids

List samples which have  $\leq 50\%$  solids

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**Actions:**

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)

## DATA REVIEW WORKSHEETS

Project Number: JA94117

Date: 12/06-07/2011

### REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Region 2, SOP HW-24, Validating Volatile Organic Compounds by GC/MS, SW-846 Method 8260B (August, 2009-Revision 2), the USEPA National Functional Guidelines for Low/Medium Concentration Organic Data Review (SOW SOM01.2 SOP HW-33, August 2009 – Revision 2), the USEPA National Functional Guidelines for Organic Data Review for Low Concentration (SOP HW-13, August, 2009-Revision 3). Also, QC criteria from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 (Final Update IV, December 1998)," specifically for Methods 8000/8260B are utilized. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: JA94117 Sample matrix: Soil

No. of Samples: 7

Trip blank No.: JA94117-7

Field blank No.: -

Equipment blank No.: -

Field duplicate No.: -

☒ Data Completeness

☒ Holding Times

☒ GC/MS Tuning

☒ Internal Standard Performance

☒ Blanks

☒ Surrogate Recoveries

☒ Matrix Spike/Matrix Spike Duplicate

☒ Laboratory Control Spikes

☒ Field Duplicates

☒ Calibrations

☒ Compound Identifications

☒ Compound Quantitation

☒ Quantitation Limits

Overall Comments: Selected VOC's by SW846-8260B

#### Definition of Qualifiers:

J- Estimated results

U- Compound not detected

R- Rejected data

UJ- Estimated non-detect

Reviewer: Rafael Defaut

Date: 12/19/2011

## DATA COMPLETENESS

DATE RECEIVED

[illegible]

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below \_\_\_\_\_

### HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

### Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH ≤ 2, 4°C), no air bubbles.

Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.

Soil samples- 7 days from sample collection.

Cooler temperature (Criteria: 4 ± 2 °C): 3°C - OK

### Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).

If the % solids of soil samples is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).

If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).

If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).

If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).

If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

## DATA REVIEW WORKSHEETS

All criteria were met X  
Criteria were not met see below \_\_\_\_\_

## GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

  X   The BFB performance results were reviewed and found to be within the specified criteria.

  X   BFB tuning was performed for every 12 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:

If mass calibration is in error, all associated data are rejected.



## DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below X

### CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 09/14/11 10/28/11 11/08/11  
 Dates of continuing calibration: 12/12/11 12/12/11 12/13/11 12/10/11 12/12/11  
 Instrument ID numbers: GCMS4B GCMSD GCMSY  
 Matrix/Level: Aqueous/low

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
12/12/2011	cc435-20	23.6	MIBK	JA94117-7

#### Criteria

All RFs must be  $> 0.05$  regardless of method requirements for SPCC.  
 All %RSD must be  $\leq 15\%$  regardless of method requirements for CCC.  
 All %Ds must be  $\leq 20\%$  regardless of method requirements for CCC.  
 It should be noted that Region 2 SOP HW-24 does not specify criterion for the curve correlation coefficient (r). A limit for r of  $\geq 0.995$  has therefore been utilized as professional judgment.

#### Actions

If any compound has an initial RF or a continuing RF of  $< 0.05$ , estimate positive results (J) and reject nondetects (R), regardless of method requirements.  
 If any compound has a %RSD  $> 15\%$ , estimate positive results (J) and use professional judgment to qualify nondetects.  
 If any compound has a %RSD  $> 90\%$ , estimate positive results (J) and reject nondetects (R).  
 If any compound has a % D  $> 20\%$ , estimate positive results (J) and reject nondetects (R).  
 If any compound has a % D  $> 20\%$ , estimate positive results (J) and nondetects (UJ).  
 If any compound has a % D  $> 90\%$ , estimate positive results (J) and reject nondetects (R).  
 If any compound has r  $> 0.995$ , estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below \_\_\_\_\_

### V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below       

### V B. BLANK ANALYSIS RESULTS (Section 3)

#### Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)

ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and  $\leq$  AL, report the compound as not detected (U) at the SQL.

If the concentration is  $\geq$  SQL but  $\leq$  AL, report the compound as not detected (U) at the reported concentration.

If the concentration is  $\geq$  SQL and  $>$  AL, report the concentration unqualified.

#### Notes:

High and low level blanks must be treated separately

Compounds qualified "U" for blank contaminations are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

# DATA REVIEW WORKSHEETS

All criteria were met \_\_\_\_\_  
 Criteria were not met \_\_\_\_\_  
 and/or see below \_\_\_X\_\_\_

## SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND				ACTION
	1,2-DCA	DBFM	TOL-d8	BFB	
JA94077-1MS		23			No action
JA94077-1MSD		28			No action

All surrogate recoveries within laboratory control limits

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QC Limits\* (Aqueous)

LL to UL to to to to

QC Limits\* (Solid-Low)

LL to UL to 67 to 137 to to

QC Limits\* (Solid-Med)

LL to UL to to to to

1,2-DCA = 1,2-Dichloromethane-d4

TOL-d8 = Toluene-d8

DBFM = Dibromofluoromethane

BFB = Bromofluorobenzene

\* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.

\* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below           

### VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

#### 1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed. List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: <u>JA94124-3</u>	Matrix/Level: <u>SOIL</u>
Sample ID: <u>JA94077-1</u>	Matrix/Level: <u>SOIL</u>
Sample ID: <u>JA94117-7</u>	Matrix/Level: <u>AQUEOUS</u>
Sample ID: <u>JA94117-1</u>	Matrix/Level: <u>SOIL</u>
Sample ID: <u>JA93637-1</u>	Matrix/Level: <u>SOIL</u>
Sample ID: <u>JA93776-3</u>	Matrix/Level: <u>SOIL</u>

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
JA94124-3MS/-3MSD					
<u>MS</u>	<u>Ethylbenzene</u>	<u>172</u>		<u>20 - 144</u>	<u>Qualify results (J)</u>
<u>MS</u>	<u>Toluene</u>	<u>146</u>		<u>29 - 138</u>	<u>Qualify results (J)</u>

Affected sample: JA94117-6

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 70 – 130 %. Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

## DATA REVIEW WORKSHEETS

All criteria were met X  
Criteria were not met  
and/or see below \_\_\_\_\_

#### VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### MS/MSD – Unspiked Compounds

It should be noted that Region 2 SOP HW-24 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID: \_\_\_\_\_ Matrix/Level/Unit: \_\_\_\_\_

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION
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**Actions:**

- \* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).  
\* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below \_\_\_\_\_

### VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

#### 1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD?  
 Yes or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT
Recoveries within laboratory control limits			

\* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.

\* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).

If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

#### 2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below           

### IX. FIELD DUPLICATE PRECISION

Sample IDs:   JA94117-4/-5  

Matrix:   SOIL  

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD  $\pm$  30% for aqueous samples, RPD  $\pm$  50 % for solid samples. If both samples and duplicate are  $<5$  SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within laboratory and generally acceptable control limits; except for Xylenes (Total); no action taken because one of the two concentrations was less than 5 X sample quantitation limit					

#### Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.



## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below   X  

### IX. LABORATORY DUPLICATE PRECISION

Sample IDs:   JA94124-4  

Matrix:   SOIL  

Field duplicate samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD  $\pm$  30% for aqueous samples, RPD  $\pm$  50 % for solid samples. If both samples and duplicate are  $<5$  SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Benzene	0.2	0.76	0.31	84	No action
Ethylbenzene	0.2	0.38	ND	200	No action

#### Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met X  
Criteria were not met  
and/or see below \_\_\_\_\_

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

\* Area of +100% or -50% of the IS area in the associated calibration standard.

\* Retention time (RT) within 30 seconds of the IS area in the associated calibration standard.

Internal standard area within laboratory control limits

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -25%	IS AREA = -25 % TO – 50%	IS AREA > + 100%
Positive results	J	J	J
Nondetected results	R	UJ	ACCEPT

14

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below       

### XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

JA94117-1

ACETONE

RF = 0.064

$$[ ] = (61194)(50)/(280401)(0.064)$$

$$= 170.5 \text{ ppb OK}$$

## XII. QUANTITATION LIMITS

A. Dilution performed

### B. Percent Solids

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If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)